

What is claimed is:

1. An isolated protein comprising the sequence set forth in SEQ ID NO:13, SEQ ID NO:15, or SEQ ID NO:17.
2. A protein comprising a variant of the protein having the sequence set forth in SEQ ID NO:13, SEQ ID NO:15, or SEQ ID NO:17, wherein the variant
 - i) has at least 85% sequence identity to the protein of SEQ ID NO:13, SEQ ID NO:15, or SEQ ID NO:17, or
 - ii) differs from SEQ ID NO:13, SEQ ID NO:15, or SEQ ID NO:17 by no more than about 20 single amino acid substitutions, deletions or insertions, and wherein the variant is capable of binding single-stranded telomeric DNA.
3. An isolated, naturally occurring, variant of a protein having the sequence set forth in SEQ ID NO:13.
4. The variant of claim 3, wherein the variant is a splicing variant.
5. A fragment of a human Pot1p, wherein the fragment is capable of binding single-stranded telomeric DNA, and wherein the fragment comprises the polypeptide having the sequence set forth in SEQ ID NO:5.
6. An isolated protein comprising the sequence set forth in SEQ ID NO:9, or SEQ ID NO:11.
7. A protein comprising a variant of the protein having the sequence set forth in SEQ ID NO:9 or SEQ ID NO:11, wherein the variant
 - i) has at least 85% sequence identity to the protein of SEQ ID NO:9 or SEQ ID NO:11, or

ii) differs from SEQ ID NO:9 or SEQ ID NO:11 by no more than about 20 single amino acid substitutions, deletions or insertions, and wherein the variant is capable of binding single-stranded telomeric DNA.

8. An isolated, naturally occurring, variant of a protein having the sequence set forth in SEQ ID NO:9.

9. The variant of claim 8, wherein the variant is a splicing variant.

10. A fragment of a SpPot1p, wherein the fragment is capable of binding single-stranded telomeric DNA, and wherein the fragment comprises the polypeptide having the sequence set forth in SEQ ID NO:6.

11. The protein fragment of claim 10, wherein the fragment is an N-terminal fragment with an apparent molecular weight of 22 kDa.

12. An isolated non-genomic polynucleotide encoding a protein that comprises a sequence set forth in SEQ ID NO:13, SEQ ID NO:15, or SEQ ID NO:17.

13. A non-genomic polynucleotide encoding a protein that comprises a variant of the protein having the sequence set forth in SEQ ID NO:13, SEQ ID NO:15, or SEQ ID NO:17, wherein the variant

i) has at least 85% sequence identity to the protein of SEQ ID NO:13, SEQ ID NO:15, or SEQ ID NO:17, or

ii) differs from SEQ ID NO:13, SEQ ID NO:15, or SEQ ID NO:17 by no more than about 20 single amino acid substitutions, deletions or insertions, and wherein the variant is capable of binding single-stranded telomeric DNA.

14. An isolated non-genomic polynucleotide encoding a protein that comprises the sequence set forth in SEQ ID NO:9, or SEQ ID NO:11.

15. A non-genomic polynucleotide encoding a protein that comprises variant of the protein having the sequence set forth in SEQ ID NO:9 or SEQ ID NO:11, wherein the variant

i) has at least 85% sequence identity to the protein of SEQ ID NO:9 or SEQ ID NO:11, or

ii) differs from SEQ ID NO:9 or SEQ ID NO:11 by no more than about 20 single amino acid substitutions, deletions or insertions, and wherein the variant is capable of binding single-stranded telomeric DNA.

16. An isolated polynucleotide encoding a naturally occurring variant of a protein having the sequence set forth in SEQ ID NO:9 or SEQ ID NO:13.

17. The polynucleotide of claim 16, wherein the encoded variant is a splicing variant.

18. An isolated polynucleotide encoding a fragment of Pot1p, wherein the fragment is capable of binding single-stranded telomeric DNA, and wherein the fragment comprises the polypeptide having the sequence set forth in SEQ ID NO:5 or SEQ ID NO:6.

19. An antibody, or a fragment or variant thereof, that is capable of binding a Pot1 protein.

20. A method of making the antibody to a Pot1p, comprising isolating the antibody from an animal or isolating an antibody-producing cell from an animal,

following administration of a Pot1 protein, or an antigenic fragment thereof, to the animal.

21. An antibody made the method of claim 20.

22. A method of increasing the life-span of a cell, comprising inserting a vector comprising a *POT1* polynucleotide into the cell, wherein the *POT1* polynucleotide is operably linked to a promoter that allows the polynucleotide to be transcribed.

23. The method of claim 22, wherein the vector comprising a *POT1* polynucleotide is administered to an individual in a pharmaceutical composition, comprising the polynucleotide and a pharmacologically acceptable excipient, diluent, or carrier.

24. The method of claim 23, wherein the pharmaceutical composition comprises a carrier.

25. The method of claim 24, wherein the carrier is capable of preferentially delivering the polynucleotide to a specific cell population.

26. The method of claim 25, wherein the vector comprising the *POT1* polynucleotide is inserted into the cell *in vitro*.

27. The method of claim 26, wherein the cell is subsequently administered to an individual.

28. The method of claim 22, wherein the cell is capable of expressing a second polynucleotide that encodes an exogenous protein.

29. A method of identifying a compound that interferes with the binding of a Pot1 polypeptide to single-stranded telomeric DNA, comprising determining whether the candidate compound decreases the binding of the Pot1 polypeptide to a single-stranded telomeric DNA molecule in a mixture comprising the single-stranded telomeric DNA molecule, the polypeptide, and the candidate compound.

30. A pharmaceutical composition comprising a compound identified by the method of claim 29.

31. A method of decreasing the life-span of a cell, comprising reducing the level of Pot1p activity in a cell.

32. The method of claim 31, wherein the cell is an immortal cell line.

33. The method of claim 31, wherein the cell is a cancer cell.

34. The method of claim 31, comprising administration to an individual of a pharmaceutical composition comprising a compound that interferes with the binding of a Pot1 polypeptide to single-stranded telomeric DNA.

35. A method of detecting or measuring the presence of a Pot1 polypeptide, comprising contacting the antibody of claim 19 with a biological sample from an individual.

36. A method of detecting or measuring the presence of a *POT1* polynucleotide, comprising contacting the *POT1* polynucleotide, or its complement, with a biological sample from an individual.